Patents, mass innovation and the Xiaokang society

Article (Accepted Version)

Intellectual Property and Development: Patents, Mass Innovation and the Xiaokang Society

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Introduction

The interpretation of intellectual property norms has been a fascinating topic especially when cutting across legal jurisdictions where social, historical and cultural perceptions of ownership vary. The issue of development presents a kaleidoscopic view of intellectual property rights. It begs the basic question whether Western justification for intellectual property is still legitimate at the receiving end of the regime. Classic justification for intellectual property rights is rooted in purely Western values of labour theory, individual ownership, personality right theory and economic and utilitarian rationales, yet when replicating this in other civilisations where communal values traditionally outweigh private ownership, such justification appears to be lame and fraught with contradiction.

This contradictory nature of intellectual property rights lies in the presumption that a limited period of artificial static market competition is instituted for the purpose of promoting greater innovation. This calculation, however, needs constant weighing and balancing to counteract adverse effects of abusive market power and stifling creativity. For example, the Médecins Sans Frontières' (MSF) Access to Medicines Campaign challenges the legitimacy of drug patent monopolies, new emerging digital technologies constantly disrupt and reconfigure the boundaries of copyright, and bio-piracy exposes the unfair nature of intellectual property rules in international development—to name just a few.

One of the prominent features of contemporary intellectual property rights is that the majority are owned by legal persons or big corporations instead of individual creators.[1] This compels us to reconsider the personality justification for intellectual property and the hypothesis of intellectual property as a "human" right.

There have been several initiatives reflecting upon the shadow of intellectual property. For example, the General Assembly of the World Intellectual Property Organization (WIPO) expressed the need for a development-oriented intellectual property regime which aims to promote creativity and technology transfer.[2] Peter Yu considers the role of geography in shaping intellectual property, highlighting the uneven sub-national development in developing countries.[3] He further consults the traditional Chinese philosophy of the Yin-Yang school in order to adapt intellectual property norms to the information economy by

[*] Email: Phoebe.Li@sussex.ac.uk. An earlier version of this paper, "Intellectual Property with Chinese Characteristics: Reflections on Patents", was presented at the Sussex China Seminar Series at the University of Sussex (2015) and at the "Towards Mass Entrepreneurship and Innovation: The Case of 3D Printing in Healthcare Delivery" Conference at the School of Public Administration, Central South University in Changsha, China in April 2016. I am grateful for the funding received from the UK Engineering and Physical Sciences Research Council, the UK Arts and Humanities Research Council, and the British and Irish Law Education and Technology Association for conducting research on 3D printing and intellectual property. I would like to express my gratitude to Professors Peter K. Yu and Roger Brownsword for their comments on an earlier draft. All errors remain mine.

[1] "Top 300 Organizations Granted U.S. Patents in 2015: Are More Patents Better?", available at *http://www.ipo.org/wp-content/uploads/2016/06/2015-Top-300-Patent-Owners.pdf* [Accessed November 1, 2016].

[2] WIPO, "Committee on Development and Intellectual Property (CDIP)", available at *http://www.wipo.int/policy/en/cdip/* [Accessed November 1, 2016].

[3] Peter K. Yu, "Intellectual Property Geographies" (2014) 6 WIPO J. 1.

"striking an appropriate non-linear, dynamic balance in a pluralistic order".[4] He is of the view that such a non-binary Yin-Yang approach would better accommodate multi-stakeholders' interests in intellectual property, the complexities of which have been compounded by emerging disruptive technologies.

Granted, intellectual property rights and flexibilities of intellectual property could be deemed as the two equal forces of yin and yang, which constantly redefine and carve out each other in an organic manner. One of the key restrictions to patent monopolies is compulsory licensing, which is a decisive instrument for regulating patents on the grounds of protecting the public interest under certain circumstances. It could be used to promote development.[5] In my other works I consider the role and legal status of compulsory licensing being not an exception but a conditional right of a member of the World Trade Organization (WTO). By treating compulsory licensing as a "right" instead of an "exception", the burden of proof is shifted to the complaining party, and the invoking state is deemed right to do so until proven otherwise.[6] There needs to be a dynamic balance between rights and flexibilities, and rights and responsibilities, of intellectual property. The monopolies of intellectual property are expected to discharge the associated responsibilities of disseminating and diffusing technologies as stated in the principles of the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights 1994 (TRIPS Agreement).[7] As an Indian judge expresses in the 2013 compulsory licensing decision:

> "[A] right cannot be absolute. Whenever conferred upon a patent holder, the right also carries accompanying obligations towards the public at large. These rights and obligations, if religiously enjoyed and discharged, will balance out each other. A slightest imbalance may fetch highly undesirable results".[8]

Nevertheless, the trigger for a compulsory licence has always been under heated debate in developing countries which have been susceptible to a troubled intellectual property discourse. Intellectual property rights and flexibilities appear to be two disjointed forces, and big corporations' strategic intellectual property entrenchment has resulted in greater inequalities in society. It is thus desirable to harness the two forces of intellectual property from the viewpoint of development. Against this backdrop, this article will consider the role of development in intellectual property and, conversely, the role of intellectual property in development.

Notably, the Nobel Prize winner and economist Joseph Stiglitz, has urged China to foster a development-oriented intellectual property regime, and to be cautious about blindly adopting an inefficient intellectual property regime that has proven to be stifling for innovation.[9] It is thus desirable to build an indigenous intellectual property regime taking development into consideration.

I will take China as a case study, examining how in recent years the country has striven to make a transition from a manufacturing power to an innovation power. Intellectual property is inherently not an indigenous system in China. Though some form of monopoly could be traced back in history, mainstream Confucianism views free dissemination of knowledge as a key factor for social progress, and familial and communal values as outweighing individual rights.[10] Creativity and innovation were not viewed as individual

[4] Peter K. Yu, "Intellectual Property, Asian Philosophy and the Yin-Yang School" (2015) 7 WIPO J. 1.

[5] Joseph E. Stiglitz, "Creating the Institutional Foundations for a Market Economy" in David Kennedy and Joseph E. Stiglitz (eds), *Law and Economics with Chinese Characteristics: Institutions for Promoting Development in the Twenty-First Century* (Oxford: Oxford University Press, 2013), p.266.

[6] Phoebe Li, *Health Technologies and International Intellectual Property: A Precautionary Approach* (Oxon: Routledge, 2014).

[7] Agreement on Trade-Related Aspects of Intellectual Property Rights 1994 art.8 ; Phoebe Li, "Rights and Responsibilities of Patents: A Precautionary Patent Regime in WTO Law" (2013) 35 Eur. Intell. Prop. Rev. 216.

[8] India Compulsory Licence, Application No.1 of 2011, p.2.

[9] Stiglitz, "Creating the Institutional Foundations for a Market Economy" in Kennedy and Stiglitz (eds), *Law and Economics with Chinese Characteristics* (2013), p.249.

[10] Peter K. Yu, "Intellectual Property and Confucianism" in Irene Calboli and Srividhya Ragavan (eds), *Diversity in Intellectual Property: Identities, Interests, and Intersections* (New York: Cambridge University Press, 2015).

property. Hence there exist discussions that the underlying reason for low intellectual property protection and enforcement is due to Confucianism.

In relation to copyright, in a quote from the *Analects* (*Lunyu*)—selected sayings of Confucius—the master mentions that he had only "transmitted what was taught to [him] without making up anything of [his] own". He was of the view that new knowledge was made transformative use of pre-existing works.[11] Another famous defence is illustrated in William Alford's book *To Steal a Book Is an Elegant Offense*.[12] In addition to the Confucian implications for copyright, the Confucian approach also has a profound impact on patents—specifically on the interpretation of "pubic interests" in the patent regime.

In the following sections, I will introduce the traditional concept of "*xiaokang*" (moderately prosperous) to facilitate the smooth transition from corporate elite innovation to mass entrepreneurship and innovation (crowd or public innovation),[13] with a view to building an innovation power and an equitable differentiated intellectual property regime. I will then discuss the recent Chinese patent law reform for meeting the needs of such a transition. We next should ask: how do we make a smooth transition from corporate to mass innovation for intelligent manufacturing? How could such a unique market economy deal with the ramifications of development and inequalities in intellectual property? How could the slogans and the government's agenda realise the vision of a socialist market with Chinese characteristics? What lessons are to be learned, and could be learned, from the Chinese characteristics in regulation? This article will examine to what extent Chinese characteristics could contribute to interpreting a sustainable intellectual property regime, and to relieving the social divide brought about by intellectual property monopolies.

In this article I will argue that in the digital economy it is no longer satisfactory to engage the elite few in innovation, and that a customised intellectual property regime is essential for the transition to mass innovation. The next step for consolidating an innovation power is to bridge the gap between the two spectrums of the market. In transition from elite corporate innovation to mass innovation, a sophisticated or differentiated intellectual property regime aiming at promoting equality and enhancing the public's access to science is necessary. I will examine the interpretations of selected key terms in the development of contemporary patent law in China. I will further explore what intellectual property is with Chinese characteristics and, particularly, the implications of "harmonious society", "*xiaokang* society" and the "public interest" in the Chinese context.

This article is divided into four parts. The first section will illustrate why the development agenda is critical for building intellectual property institutions in developing countries. The second section will review the rationale for technological regulation in China by looking into the traditional values of "equilibrium", "harmony" and "*xiaokang* society". The third section will apply the preceding rationale in contemporary patent law-making, considering the recent amendment to Patent Law of the People's Republic of China 1984 (Patent Law) amendment and the pressing need for fostering mass innovation towards intelligent manufacturing. The final section will conclude by providing signposts for future work.

The new intellectual property power and development

China has emerged as the world's second largest economy and ranked third in international applications through the Patent Cooperation Treaty (PCT) since 2013.[14] Yet, the clash between socialism and capitalism introduced after the opening up of the market in 1978 is demonstrated by growing inequality, disparities and social divide in many contexts. A high degree of inequality is now a prominent feature in China's

[11] Peter K. Yu, "The Confucian Challenge to Intellectual Property Reforms" (2012) 4 WIPO J. 1.

[12] William P. Alford, *To Steal a Book Is an Elegant Offense: Intellectual Property Law in Chinese Civilization* (Stanford: Stanford University Press, 1995).

[13] Liu Wei, "Entrepreneurs Get Ahead in Chinese Business", available at *http://www.telegraph.co.uk/sponsored/china-watch/business/11621036/entrepreneurs-get-ahead-in-business.html* [Accessed 9 September, 2016]; Emma Boyde, "The Rise of the Asian Entrepreneur", available at *http://www.ft.com/intl/cms/s/0/41b9ac52-efd5-11e4-ab73-00144feab7de.html* [Accessed November 1, 2016].

[14] WIPO, *Patent Cooperation Treaty Yearly Review: The International Patent System* (Geneva, 2014).

market economy, and is demonstrated by income inequality,[15] education inequality, innovation inequality,[16] and regional inequality[17] where rural-urban and inland-coastal divides are widening.[18] The country is now comprised of developed, developing and under-developed regions. Even with the government's "go west" strategy in 2000, which aimed to bridge the gaps across regions, disparities are still prominent.[19] It is surprising to learn that income and regional disparities are now greater in China than those in the United States,[20] and that income inequality has led to one per cent of the Chinese population possessing one-third of the country's wealth.[21]

The current challenge in China is not under-development but rather fair, equitable, justifiable and all-round balanced development. China's former leader, Deng Xiaoping, once revealed that "we permit some people and some regions to become prosperous first, for the purpose of achieving common prosperity faster".[22] Following on from Deng Xiaoping's strategic view that some people should be allowed to get rich before others, how could the intermediate goal of "getting a handful rich" be transformed into the promise of a "well-off, prosperous (*xiaokang*) society" enjoyed by all?

Recently, the Chinese Government announced the 13th Five-Year Plan for Economic and Social Development (2016–2020) (135 Plan) which mandates the building of a manufacturing power by integrating intelligent manufacturing.[23] It is stressed that promoting shared development is necessary for developing a "*xiaokang*" society in all respects, which is the end target for mass and crowd innovation. It is proposed that development should be people-centred—that is, development is for the people, development is reliant on the people, and the people should share the results of development.[24] Sharing is the essence of socialism with Chinese characteristics, and thus five goals are put forward: innovative development, harmonious development, green development, open development and shared development. In so doing, an equitable intellectual property regime is key to innovation in the market economy.

In this article I will argue that the way to combating inequality in intellectual property institutions is by means of enhancing mass entrepreneurship and innovation, and that the transition from elite innovation to mass entrepreneurship and innovation is ultimately dependent upon the huge task of reducing disparities in access to infrastructure and access to knowledge. The following section will reflect on the unique Chinese approach to technological regulation set in the historical, philosophical and socio-political context.

Approaches to regulation of technologies with Chinese characteristics

According to *Historical Records* (*Shiji*) there were six dominant schools in Chinese philosophy: Yin-Yang, Confucianism (*Rujia*), Mohism (*Mojia*), School of Names, Dialecticians or Logicians (*Mingjia*), Legalism (*Fajia*) and Daoism. Yet in traditional Chinese society, the three mainstream philosophies are Buddhism, Confucianism and Daoism, collectively named as *Sanjiao* (three schools).[25] In modern society, we can

[15] "Gini out of the Bottle", *The Economist*, January 26, 2013.

[16] Fan Peilei and Wan Guanghua, "China's Regional Inequality in Innovation Capability: 1995–2004" in Wan Guanghua (ed.), *Inequality and Growth in Modern China* (New York: Oxford University Press, 2008), p.144.

[17] Xie Yu and Zhou Xiang, "Income Inequality in Today's China" (2014) 111 Proc. Nat'l Academy Sci. 6928, available at *http://www.pnas.org /content/111/19/6928.full.pdf* [Accessed November 1, 2016].

[18] Liu Xielin and Liu Fianbing, "Science and Technology and Innovation Policy in China" in Jose Eduardo Cassiolato and Virginia Vitorino (eds), *BRICS and Development Alternatives: Innovation Systems and Politics* (London: Anthem Press, 2011), p.154.

[19] Liu and Liu, "Science and Technology and Innovation Policy in China" in Cassiolato and Vitorino (eds), *BRICS and Development Alternatives* (2011), p.157.

[20] Xie and Zhou, "Income Inequality in Today's China" (2014) 111 Proc. Nat'l Academy Sci. 6928.

[21] Institute of Social Science Survey, Peking University, 2014.

[22] Xie and Zhou, "Income Inequality in Today's China" (2014) 111 Proc. Nat'l Academy Sci. 6928; "Gini out of the Bottle", *The Economist*, January 26, 2013.

[23] "The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China", available at *http://m.thepaper.cn/newsDetail _forward_1445312?from=groupmessage&isappinstalled=0* [Accessed November 1, 2016].

[24] "The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China", Ch.4, available at *http://m.thepaper.cn /newsDetail_forward_1445312?from=groupmessage&isappinstalled=0* [Accessed November 1, 2016].

[25] Yu, "Intellectual Property and Confucianism" in Calboli and Ragavan (eds), *Diversity in Intellectual Property* (2015).

see the convergence of Buddhism and Daoism in people's religious life, whilst Confucianism remains the foundation of social and intellectual values.

Daoism was founded by Lao Zi in the sixth century BC. Lao Zi saw Dao (the way of heaven) as a natural law. His main teaching was that of "*wu wei*" which means "non-action" or "not acting". One typical saying is that "we shape clay into a pot, but it is the emptiness inside that holds whatever we want". It could be interpreted that Daoism holds a laissez-faire approach to regulation and expects that Dao will automatically redress abnormalities in due course.

Confucianism was founded by Master Kong (Kong Zi) in 551–479 BC. Compared to Daoism, Confucianism holds a humanistic view to life and establishes Confucius' ideal of social control through moral education (that is, a rule of Li without laws). It could be interpreted that the Confucian approach to regulation would depend on evaluating whether technologies could relieve pain and how actions should be adopted to avoid abuse of human worth and dignity.[26]

It is also noteworthy that Legalism played a deciding role in the Qin Dynasty when China experienced its first technological feat in its innovation of military technologies. The first Emperor of Qin (Qin Se Huangdi, 246 BC) relied on Legalism established by Han Feizi (280–283 BC), who was of the view that man is born evil and thus the state can only rule by rigid command and by severe punishment and reward. As such, *fa* (law), *shu* (method) and *shi* (legitimacy) are the means of achieving this rigid command. Under the Legalism regime, China celebrated another technological feat in building its world-famous terracotta armies and their lethal weapons with strict control and organisation of artisans and workmanship.[27]

Chinese approaches to technological regulation are still deeply rooted in the combined rationale of Daoism (laissez faire), Confucianism (humanistic) and Legalism (rigid control). Considering the balance of the Yin-Yang forces, the optimal approach would be a balance of these three schools, acting in accordance with specific features of the technologies at issue and their unique societal implications. Chinese approaches appear to be dominated by more government intervention in steering, guiding, planning and co-ordination, compared with the Western liberal approach to the market and to regulation. The volume, pace, frequency, intensity and efficiency of the Chinese Government's policy-making in relation to fostering technological development and industry upgrade is very impressive.

Science and technology (S&T) and innovation are the main enablers for building a prosperous society set out in the *Chinese National Plan 2006–2020*. The government has thus set forth the "Special Industrial Policy" in order to foster strategic industries. Key innovative companies were given direct support by the mandates of the *National Programme 2006–2020* for the development of science and technology in the medium and long term.[28] There are agendas for decentralised innovation policy which gives regional government more autonomy in strategic innovation, albeit that evidence shows this further widens the regional gap.[29]

Alongside the philosophical underpinning, China is unique in her adoption of a wide range of slogans that accompany social and legal transformation. Although these slogans seem resolute, concise, succinct and punchy, they nevertheless often appear vague and puzzling to Western readers. It is, therefore, essential to understand the historical and cultural context of the ideologies behind them. In the following paragraphs, I will introduce selected key phrases the government used in the context of development.

For example, "harmonious society" has been a key target for economic development and emphasises "balance" with the following parameters: limited disparities between urban and rural areas, between the

[26] Fan Ruiping, *Reconstructionist Confucianism: Rethinking Morality after the West* (New York: Springer, 2010).

[27] Marco Martinon-Torres, Li Xiuzhen Janice, Andrew Bevan, Xia Yin, Zhao Kun and Thilo Rehren, "Forty Thousand Arms for a Single Emperor: From Chemical Data to the Labor Organization behind the Bronze Arrows of the Terracotta Army" (2014) 21 J. Archaeological Method & Theory 534.

[28] Liu and Liu, "Science and Technology and Innovation Policy in China" in Cassiolato and Vitorino (eds), *BRICS and Development Alternatives* (2011), pp.133–134.

[29] Liu and Liu, "Science and Technology and Innovation Policy in China" in Cassiolato and Vitorino (eds), *BRICS and Development Alternatives* (2011), p.148.

advanced and less advanced regions, between the rich and poor as well as a balance between government and society and balance across all sectors of the economy.[30] Such balance is anticipated to minimise the socio-economic disparities in development which can be traced back to the book of Zhongyong (*Doctrine of the Mean*), where the state of "equilibrium" is dubbed as the key to the state of "harmony":

> "While there are no stirrings of pleasure, anger, sorrow, or joy, the mind may be said to be in the state of equilibrium. When those feelings have been stirred, and they act in their due degree, there ensues what may be called the state of harmony. This equilibrium is the great root from which grow all the human actings in the world, and this harmony is the universal path which they all should pursue".[31]

Based upon this rationale, everything needs to be done in moderation. An extreme, drastic approach has rarely been deemed appropriate or sustainable in the history of China. Everything needs to be acted in proportion to their due degree.

As mentioned above, the present Chinese Government, as a goal for development, has picked up the concept of "*xiaokang*" in the recent 135 Plan.[32] A "*xiaokang*" society refers to a well-off, moderately prosperous society in which people lead a fairly comfortable life. The term "*xiaokang*" originates from two sources: the first, from *Shi Ji* (Book of History), implies an ideal living standard of ordinary people which refers to a *medium living standard* between "keeping warm and full (*wenbao*)" and "rich (*fuyu*)";[33] the second, from Li Ji (*The Book of Rites*) (551–479 BC), was identified by intellectuals as a secondary ideal society being compared to Utopia, namely "*tatong*".[34] *Tatong* is the ultimate ideal utopia shared by the public in which people enjoy social civilisation, stable order and security, yet without social class and exploitation. *Xiaokang* is a level lower than *tatong*, in which private ownership and social class exist but are harnessed by "*li*" (rites) to maintain social order and social life.

Tatong is the perfect world of equality, fraternity, harmony, welfare and justice that is described as "tianxia as the public":

> "When the Grand course was pursued, a public and common spirit ruled all under the sky; they chose men of talents, virtue, and ability; their words were sincere, and what they cultivated was harmony. Thus men did not love their parents only, nor treat as children only their own sons. A competent provision was secured for the aged till their death, employment for the able-bodied, and the means of growing up to the young. They showed kindness and compassion to widows, orphans, childless men, and those who were disabled by disease, so that they were all sufficiently maintained. Males had their proper work, and females had their homes. (They accumulated) articles (of value), disliking that they should be thrown away upon the ground, but not wishing to keep them for their own gratification. (They laboured) with their strength, disliking that it should not be exerted, but not exerting it (only) with a view to their own advantage. In this way (selfish) schemings were repressed and found no development".[35]

While *xiaokang* is depicted as "tianxia as family":

> "Now that the Grand course has fallen into disuse and obscurity, the kingdom is a family inheritance. Everyone loves (above all others) his own parents and cherishes (only) his own sons. People

[30] Stiglitz, "Creating the Institutional Foundations for a Market Economy" in Kennedy and Stiglitz (eds), *Law and Economics with Chinese Characteristics* (2013), p.75.

[31] *Zhongyong*, available at "The Internet Classics Archive", *http://classics.mit.edu/Confucius/doctmean.html* [Accessed October 28, 2016].

[32] "The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China", available at *http://m.thepaper.cn/newsDetail_forward_1445312?from=groupmessage&isappinstalled=0* [Accessed November 1, 2016].

[33] *Shi Ji* ("Greater Odes of the Kingdom"), available at "Chinese Classics & Translations", *http://wengu.tartarie.com/wg/wengu.php?l=Shijing&m=NOzh&no=253* [Accessed October 28, 2016] ("The people indeed are heavily burdened, but perhaps a little ease may be good for them.").

[34] *Li Ji* Bk.VII.

[35] "Chinese Text Project", trans. James Legge, available at *http://ctext.org/liji/li-yun* [Accessed October 28, 2016].

> accumulate articles and exert their strength for their own advantage. Great men imagine it is the rule that their states should descend in their own families. Their object is to make the walls of their cities and suburbs strong and their ditches and moats secure. The rules of propriety and of what is right are regarded as the threads by which they seek to maintain in its correctness the relation between ruler and minister; in its generous regard that between father and son; in its harmony that between elder brother and younger; and in a community of sentiment that between husband and wife; and in accordance with them they frame buildings and measures; lay out the fields and hamlets (for the dwellings of the husbandmen); adjudge the superiority to men of valour and knowledge; and regulate their achievements with a view to their own advantage".[36]

In a "*tatong*" society individuals will see others as their own family without differentiation, yet in a "*xiaokang*" society they will treat others in accordance with the approximation to the self which reflects that the love for self and family overrides the love for society. Confucian philosophers at that time saw the main difference between *tatong* and *xiaokang* as the lowering of social morality. Yet the ideal "*tatong*" society reflected a nostalgic and reminiscent description of humanity's original society in ancient epochs. Establishing a "*xiaokang*" society was an intermediate means of restoring the selfless world of Utopia in the long run. In other words, *xiaokang* is a realistic, practical and achievable stepping stone to the ultimate Utopia of *tatong*.

The "*xiaokang*" value sensibly recognises the frailty of mankind to differentiate self and family from the society, from which individual ownership of property emerges to form the backdrop of society. Considering both interpretations, it should be borne in mind that "*xiaokang*" is an intermediate means for achieving the ultimate "*tatong*" world where the "public and common spirit" under the sky belittles individual advantage and ownership. The corollary of the "*xiaokang*" patent regime could then be described as patents granted to mass entrepreneurs in order to build a moderately prosperous society in which people lead a fairly comfortable life, and yet various forms of public interests should be embedded in the intellectual property regime to strike a balance between public and private interests. In some circumstances, private interests should be restrained for the protection of the greater good. This view resonates with the presumption that intellectual property rights are granted as an intermediate means for the ultimate goal of promoting innovation in society. Intellectual property is a tool instituted for promoting the public interest and the public's access to the benefits arising from scientific research. Following on from the discussion on the "*xiaokang*" characteristic of patents, the next section will elaborate further on the patent regime with Chinese characteristics.

Patent power with Chinese characteristics

Contemporary Chinese patent law-making is a product of external pressure and internal push.[37] Peter Yu describes the establishment of the modern Chinese Patent Law as "building the ladder" of development, which is comprised of five stages: creation; imitation and transplantation; standardisation and customisation; indigenisation; and "what next".[38]

The "creation" stage was triggered in the late 1970s after China re-opened the market to the world in 1978, followed by its accession to the WIPO. The first Patent Law was enacted in 1984, followed by the first revision in 1992. Before the accession to the WTO, the Patent Law was again amended in 2000, with a focus on standardisation and customisation with a view to providing sufficient intellectual property protection compliant with the TRIPS Agreement . In 2008, the State Council introduced the third amendment to the Patent Law and the *National Intellectual Property Strategy Action Plan (2014–2020)* to provide a

[36] "Chinese Text Project", trans. James Legge, available at *http://ctext.org/liji/li-yun* [Accessed October 28, 2016].

[37] Peter K. Yu, "Intellectual Property, Economic Development, and the China Puzzle" in Daniel J. Gervais (ed.), *Intellectual Property, Trade and Development: Strategies to Optimize Economic Development in a TRIPS Plus Era*, 1st edn (New York: Oxford University Press, 2007), p.173.

[38] Peter K. Yu, "Building the Ladder: Three Decades of Development of the Chinese Patent System" (2013) 5 WIPO J. 1.

comprehensive plan for protecting intellectual property and to highlight the need for an independent (or self-control, self-master) intellectual property system (*zizhu zhishi chanquan*, independent intellectual property),[39] in which an indigenous innovation (*zizhu chuangxin*) policy is set forth.

The first two revisions of the Patent Law were outward-looking, focusing on building intellectual property capacity to attract foreign investment and meeting international requirements from the PCT and the WTO TRIPS Agreement . Yet from the third revision onwards, there has been a shift towards meeting internal needs—developing the patent system in the Chinese context in accordance with its own economic, technological and cultural interests.[40] Considering the need for indigenisation, the third revision of the Patent Law thus introduced the absolute novelty standard,[41] provisions concerning the protection of genetic resources,[42] the strengthening of compulsory licensing,[43] parallel importation and the Chinese equivalent of Bolar exemption.[44] The third revision of the Patent Law was then concluded in 2010.

Following on from the recent government's agenda on building an innovation power for the transition to intelligent manufacturing, I name the above "what next" stage the "mass innovation" stage, whereby the development agenda for a "*xiaokang*" society is a critical theme in striking a balance in intellectual property monopolies. The primary goal for this nascent phase is therefore not to blindly transplant foreign intellectual property infrastructure but to conscientiously build a development-oriented intellectual property institution that reflects local characteristics.[45] A "mass innovation" patent regime should be able to redress the disparities and to balance the interests of big corporations with those of mass entrepreneurs. It should differentiate certain fields of technologies for the purpose of safeguarding the public interest and not be compromised by private patent monopolies. Joseph Stiglitz elaborates on the idea that a development-oriented intellectual property regime requires special consideration to ensure effective competition, access to lifesaving medicines, the transfer of technology, and protection of traditional knowledge and genetic resources.[46]

Following the self-reliance innovation agenda, Chinese scholars have explored an intellectual property system with Chinese characteristics by proposing the "inspired self-reliance innovation theory", "state strategic theory", "interests balance theory", "institution protection theory" and the "cultural pass-on theory".[47] It is argued that a mature intellectual property system needs to be based in the Chinese context, to solve Chinese problems, to form Chinese languages, to have Chinese expressions, to voice Chinese viewpoints and to follow a Chinese path in order to form a Chinese model by amending the current Western-centric international legislative trend.[48] A socialist intellectual property system focuses on humanism, all-round equilibrium, and sustainable and harmonious development and insists that a localised intellectual property system would consist of socialist values including "fairness and justice", "honesty and trustworthiness" and "harmony and fine-management".[49]

In the search of a sustainable Chinese intellectual property system, it is highlighted that the main problem of economic and social development lies in imbalance or inequality rather than under-development. It is self-evident that the geographical disparities between urban and rural areas, east and west, and amongst

[39] State Intellectual Property Office, *National Patent Development Strategy (2011–2020)* (2010), available at *http://graphics8.nytimes.com/packages/pdf/business/SIPONatPatentDevStrategy.pdf* [Accessed November 1, 2016].
[40] Stefan Luginbuehl, "China's Patent Policy" in Stefan Luginbuehl and Peter Ganea, *Patent Law in Greater China* (Cheltenham: Edward Elgar, 2014).
[41] Chinese Patent Law 2008 art.22(5).
[42] Chinese Patent Law 2008 arts 5 and 16(5).
[43] State Intellectual Property Office, *National Patent Development Strategy (2011–2020)* (2010), para.20; Chinese Patent Law 2008 arts 48–58.
[44] Chinese Patent Law 2008 art.69.
[45] Stiglitz, "Creating the Institutional Foundations for a Market Economy" in Kennedy and Stiglitz (eds), *Law and Economics with Chinese Characteristics* (2013).
[46] Stiglitz, "Creating the Institutional Foundations for a Market Economy" in Kennedy and Stiglitz (eds), *Law and Economics with Chinese Characteristics* (2013), pp.266–267.
[47] Wu Han-Dong, "Institutionalisation of Intellectual Property Theories and Chinese Localisation Research" (2014) 6 L. & Soc. Dev.
[48] Wu, "Institutionalisation of Intellectual Property Theories and Chinese Localisation Research" (2014) 6 L. & Soc. Dev.
[49] Wu, "Institutionalisation of Intellectual Property Theories and Chinese Localisation Research" (2014) 6 L. & Soc. Dev.

fields of industry suggest that intellectual property trajectories will not follow a one-size-fits-all but a differentiated path in relation to fields of technology and location.

The scope of the granted patent right has a direct impact on free dissemination of knowledge in society. The relevant limitations to patentability set out in the Chinese Patent Law include: "inventions-creations" violating the law or social morality, or harming the public interest;[50] those being deemed as scientific discoveries; rules and methods for intellectual activities; methods for the diagnosis or treatment of diseases; and animal or plant varieties.[51] Patents may be granted for production methods of animal or plant varieties.[52]

Social morality refers to ethical and moral norms generally recognised and accepted by the public, which is a fluid concept dependent on the cultural and geographical background.[53] Inventions-creations detrimental to the public interest means the use of an invention that may cause detriment to the public or may disrupt the normal order of society, examples of which may be inventions that seriously pollute the environment, seriously waste energy or resources, disrupt the ecological balance or impair public health.[54] Interestingly, subjective limitations are set out in the *Patent Examination Guidelines* indicating that patents would not be granted for applications concerning

> "an important political event of the State or a religious belief, hurting the sentiments of the people or of an ethnic group, or advocating superstition".[55]

Again, the interpretation of such an iteration could be extremely broad. It suggests that the social element of the public's perception to patent monopolies could play a major part in patent granting.

Currently, the fourth amendment to the Chinese Patent Law has been underway since 2014 following a range of goals the State Intellectual Property Office of China (SIPO) set out in the *National Patent Development Strategy (2011–2020)*. Major policy measures determined by the strategy include revising and improving the Patent Law, increasing *zizhu chuangxi* (indigenous innovation) and improving the enforcement of patent rights.

Zizhu chuangxi means innovation activities that are able to select new innovative goals independently, to dominate the innovation process and to own and utilise innovative outcomes.[56] In a market economy, an innovative state with Chinese characteristics refers to strong innovative capacity, high innovative efficiency, excellent innovative environment and abundant innovative talents.[57] It is believed that in order to improve the efficiency of resource allocation, the government's leadership would need to combine organically with the functions of the market.[58] It is stressed that the role of the government to co-ordinate resources for technological innovation is particularly vital for spurring market vitality and social creativity. Key industries that require the central government's involvement are those connected to the state's strategic technologies and public interest-related technologies (*minsheng* technologies that are closely connected to the population's livelihood and fundamental frontier technologies).[59]

Evidently, the fourth amendment to the Patent Law aims to build an intellectual property power with Chinese characteristics and socialism. The main agenda includes broadening patent protection, promoting the implementation and utilisation of patents, implementing government services, perfecting patent

[50] Chinese Patent Law 2008 art.5.
[51] Chinese Patent Law 2008 art.25.
[52] Chinese Patent Law 2008 art.25.
[53] State Intellectual Property Office, *Patent Examination Guidelines* (2010), Pt II, Ch.1, art.3.1.2.
[54] State Intellectual Property Office, *Patent Examination Guidelines* (2010), Pt II, Ch.1, art.3.1.2. Examples of inventions contrary to social morality or detrimental to the public interest include: a process for modifying the germ line genetic identity of human beings; a process for cloning human beings or a cloned human being; use of human embryos for industrial or commercial purposes; a process for modifying the genetic identity of animals likely to cause them suffering without any substantial medical benefits to human beings or animals.
[55] State Intellectual Property Office, *Patent Examination Guidelines* (2010), Pt II, Ch.1, art.3.1.2.
[56] Chinese Academy of Sciences, *Technological Revolution and Modernisation of China—Innovation 2050: Science and Technology and the Future of China* (Beijing: Science Press, 2009), p.116.
[57] Chinese Academy of Sciences, *Technological Revolution and Modernisation of China* (2009), p.116.
[58] Chinese Academy of Sciences, *Technological Revolution and Modernisation of China* (2009), p.129.
[59] Chinese Academy of Sciences, *Technological Revolution and Modernisation of China* (2009), p.129.

examination for quality patents and perfecting patent agency systems.[60] In order to facilitate the implementation of new technologies, the new proposed Patent Law incorporates an implied licensing mechanism for standard essential patents. A patent holder should not grant an exclusive licence or file for an injunction during the period of licensing rights.[61]

It is noteworthy that, whilst enlarging the scope of patent protection is a key objective, it sets out a separate principle clause with a view to regulating the abusive use of patents as well as balancing private and public interests, reflecting the objectives and purpose clauses of the TRIPS Agreement . The proposed art.14 on the purpose of patents reads:

> "The implementation of patent rights shall abide by the good faith principles, shall not harm the public interest, shall not improperly exclude or restrict competition, shall not impede the advancement of technology".

The interpretation of "good faith" and the "public interest" is again vague and broad.

In recent years, there has been an increasing emphasis on constructing an intellectual property power and an innovative country for a "*xiaokang*" society in the *Action Plan for Carrying out the National Intellectual Property Strategy (2014–2020)*.[62] A corollary to the "*xiaokang*" approach in the intellectual property regime is the suggestion that intellectual property is never absolute, but should be weighed against other diverse interests for achieving equilibrium and harmony.[63] This is where the Yin-Yang school comes into play. Alongside the Yin-Yang school, the "*xiaokang*" spirit demonstrates the intermediate and self-restraining characteristic of patents, which will serve well to balance the diverse stakeholders' interests, particularly the transition from elite corporate innovation towards mass entrepreneurship and innovation, as required by the government's intelligent manufacturing agenda. In an economy aiming to foster mass entrepreneurship and innovation, consideration should be taken in striking a balance between the tension arising from the clash of interests of big corporations and those of individual entrepreneurs.

The next section delineates a differentiated intellectual property regime customised for socially valued inventions that are closely related to people's livelihood.

A differentiated approach to intellectual property for socially valued inventions

Technologies that result in significant social impacts and that are fundamental to addressing societal values are what I call "socially valued inventions" (SVI), or the Chinese call "*minsheng* (people's livelihood) technologies". They have a direct impact on societal needs in terms of human rights and equality which, in my view, merit a distinct "public goods" approach to incentivising innovation.[64] Subjecting SVI to free market competition without government planning and co-ordination would likely result in market failure, as seen in the access to medicines and orphan drugs scenarios.

There are increasing concerns over the monopolistic power on key innovation in a free market. The view that creativity and innovation are not individual property but "public goods" is also expressed in the debate amongst leading economists on the ramifications of privatising knowledge about key technologies which are to serve societal interests. For example, Keith Maskus considers intellectual property rights in response to the governance of technologies that are vital in serving the public interest in health, climate

[60] China IPR, "Translation of the Draft Patent Law Amendment" and *SIPO's Explanations about the Draft Amendment to the Patent Law*, available at *https://chinaipr.com/2015/12/17/translation-of-draft-patent-law-amendment/* [Accessed November 1, 2016].

[61] Draft Fourth Amendment to the Chinese Patent Law art.83.

[62] State Council of China, *Action Plan for Carrying out the National Intellectual Property Strategy (2014–2020)* (2014), para.64; State Intellectual Property Office, *National Intellectual Property Strategy Action Plan (2014–2020)* (2014); Office of the Inter-Ministerial Joint Meeting for Implementation of the National Intellectual Property Strategy, *Promotion Plan for the Implementation of the National Intellectual Property Strategy 2015* (2015).

[63] *Shi Ji* ("Greater Odes of the Kingdom").

[64] Phoebe Li, "3D Bioprinting Technologies: Patents, Innovation and Access" (2014) 6 L. Innovation & Tech. 282.

change, genetic resources and traditional knowledge.[65] He proposes a "comprehensive approach" to innovation which incorporates broader elements of intellectual property,[66] with a view to minimising the negative effects of patents on society. Such a comprehensive approach is proposed for

> "regulating the use of [intellectual property rights] that help bring these poorer regions and groups more fully into the modern commercial system".[67]

Furthermore, Joseph Stiglitz proposed a similar "portfolio approach" to assessing China's innovation strategy.[68] Both share the view that strong intellectual property rights alone are insufficient for further technological development. Wider drivers for innovation, such as government funding, prize systems, competition, trade secrets and human capital, are playing a vital role in efficient innovation.

The differentiated approach to intellectual property is demonstrated in different industries and technological sectors in China. While patents play an important role in digital communication,[69] they are not a critical element for the software industry, and the Chinese Patent Law provides a relatively narrower scope of protection for biotech and pharmaceutical patents,[70] partly due to a successful agricultural biotechnology industry that is mainly in the public sector.

Efforts to build a differentiated intellectual property regime are overarching and diverse. For example, the Chinese Government aims to strengthen intellectual property in key technologies and sets out the mechanism of "preferential examination of invention patent applications" for strategic emerging industries such as energy saving and environmental protection, the new-generation information technology, biology, high-end equipment manufacturing, new energy, new materials and green technologies.[71] Stronger protection for innovative pharmaceutical technologies, new varieties of plants and geographical indications for farming produce (Golden farming engineering)[72] have also been noted. Key fields in relation to living security (*minsheng* or people's livelihood) and high-tech industry given intellectual property enforcement include food, pharmaceuticals, medical apparatus and environmental protection. As to the innovation of a universal health system, the Chinese Academy of Sciences sets out the goals of shifting the current medical model from disease therapy to diagnostic prevention and intervention and combining contemporary life sciences and traditional medicine.[73]

Another example of realising mass entrepreneurship and innovation is through fostering digital intelligent manufacturing in 3D printing. The Chinese Government is now keen to facilitate mass entrepreneurship and innovation by means of promoting the development of makerspaces in specific pilot sectors such as information, biotech, modern agriculture, high-end device manufacture, new energy, new materials, energy efficiency and modern service industry.[74] Small and medium-sized enterprises (SMEs) may benefit from certain government policy in fostering new start-up businesses, yet still find it difficult to compete against big corporations in securing funding. SMEs are also less resourceful in managing a healthy intellectual

[65] Keith, E. Maskus, *Private Rights and Public Problems: The Global Economics of Intellectual Property in the 21st Century* (Washington: Peterson Institute for International Economics, 2012), pp.233–312.

[66] Keith E. Maskus, "Intellectual Property Rights in the WTO Accession Package: Assessing China's Reforms" in Deepak Bhattasali, Li Shantong and Will Martin (eds), *China and the WTO: Assessing, Policy Reform, and Poverty Reduction Strategies* (Oxford: Oxford University Press, 2004), p.66.

[67] Maskus, "Intellectual Property Rights in the WTO Accession Package" in Bhattasali, Li and Martin (eds), *China and the WTO: Assessing, Policy Reform, and Poverty Reduction Strategies* (2004), p.66.

[68] Joseph E. Stiglitz, "Institutional Design for China's Innovation System: Implications for Intellectual Property Rights" in Kennedy and Stiglitz (eds), *Law and Economics with Chinese Characteristics* (2013).

[69] WIPO, *Patent Cooperation Treaty Yearly Review* (2014).

[70] Li Yahong, "Intellectual Property and Innovation: A Case Study of High-tech Industries in China" (2010) 13 Or. Rev. Int'l L. 263.

[71] Office of the Inter-Ministerial Joint Meeting for Implementation of the National Intellectual Property Strategy, *Promotion Plan for the Implementation of the National Intellectual Property Strategy 2013* (2013).

[72] Office of the Inter-Ministerial Joint Meeting for Implementation of the National Intellectual Property Strategy, *Promotion Plan for the Implementation of the National Intellectual Property Strategy 2013* (2013).

[73] Chinese Academy of Sciences, *Technological Revolution and Modernisation of China* (2009), p.42.

[74] Council of the People's Republic of China, "State Council Encourages Development of Makerspaces", available at *http://english.gov.cn/policies/latest_releases/2016/02/18/content_281475292128478.htm* [Accessed November 1, 2016].

property portfolio due to insufficient awareness or capacity to do so. Intellectual property is generally not recognised as an effective company asset. Some feel uneasy about applying patent monopolies on the "knowledge taught by teachers"; others may use patent applications solely as a means of securing government funding.[75] In order to build the intellectual property infrastructure for crowd and mass innovation, strategic considerations for fostering mass innovation should be given priority over corporate innovation. For example, customising the patent regime for SMEs in relation to patent application, licensing platforms and mechanisms for maintaining rights.

Following the Yin-Yang school and the "*xiaokang*" objectives, an optimal patent regime inherently carries a self-restraining force, expected to be complemented by other innovation initiatives. The current patent regime appears to be archaic for emerging technologies. One prominent example is the multi-faceted challenge posed by grassroots open innovation in 3D printing, whereby consumers are becoming "prosumers" by engaging in product development and content generation.

One of the prominent features of 3D printing is decentralisation of the production chain. Localisation, or re-distributed manufacturing in 3D printing, creates opportunities for grassroots local production and potentially offers the solution to reducing disparities in development. Yet, 3D printing not only disrupts the legal norms of intellectual property, but also the broader legal context such as risk regulation and safety, product liability, consumer protection and insurance policy. The disruptive nature of emerging technologies requires a holistic and interdisciplinary approach to customising the intellectual property regime. It is thus insufficient to consider patents within the traditional domain of the intellectual property castle.

There are four steps of development in indigenous innovation: imitation and reverse engineering; re-innovation (improved invention); collective innovation (combined invention); and original innovation. Only those inventions that reach the original innovation level can be granted patent monopoly. Yet inventions developed from mass entrepreneurship and innovation are mostly incremental, and typically lower than the standard "novelty" requirement. The rise of aesthetic functional objects also blurs the traditional dichotomy between patents and copyright. The quick turn-around rate of consumer products does not fit neatly into the lengthy patent term. Furthermore, in response to the above challenges posed to patents, alternative proposals for a differentiated patent regime should be considered by accommodating micro-patents,[76] partial patents,[77] quasi-patents and semi-patents, weakening patents[78] that are tailored for mass innovation in the digital economy.

Future Patent Law amendment: A "xiaokang" patent regime for mass innovation

In an intelligent manufacturing era, an intellectual property power is defined by the ability to foster mass entrepreneurship and innovation as opposed to the entrenched monopolies granted to corporate innovation. The patent system will need to reflect the need for public access to scientific innovation which strikes an optimal balance between public and private interests. Following the rationale of equilibrium and harmony, intellectual property rights are not absolute and should be self-restraining specifically in matters relating to socially valued innovation. Patents are an intermediate means of achieving prosperity for all in society.

I have introduced the "*xiaokang*" characteristic of the patent system tailored for mass entrepreneurship and innovation. It is proposed in this article that a patent power is the ability to empower the mass public and not only the elite few, and that a "*xiaokang*" approach to intellectual property is fit for purpose and for redressing the widening inequality in society.

[75] Findings from my interviews with Chinese 3D printing industry in 2016.
[76] Hod Lipson and Melba Kurman, *Fabricated: The New World of 3D Printing*, (Indianapolis: Wiley, 2013), pp.237–238.
[77] Gideon Parchomovsky and Michael Mattioli, "Partial Patents" (2011) 111 Colum. L. Rev. 207.
[78] Lucas Osborn, Joshua M. Pearce and Amberlee Haselhuhn, "The Case for Weaker Patents", available at *http://ssrn.com/abstract_id=2585764* [Accessed November 1, 2016].